CHALLENGES IN URBAN METEOROLOGY: A FORUM FOR USERS AND PROVIDERS

September 21–23, 2004
Doubletree Hotel & Executive Meeting Center
1750 Rockville Pike
Rockville MD 20852

Theme: Information to Improve Community Responses to Urban Atmospheric Hazards, Weather Events, and Climate

Scope/Impact: Nearly two-thirds of the U.S. population lives in urban areas occupying less than two percent of the U.S. landmass. America's vulnerability to severe weather, homeland security incidents, and risks from air and water quality and climatic variations are rising as more of the population moves into areas prone to these hazards.

- $11 billion in damages per year occur from hurricanes, tornadoes, floods and other severe weather.
- Adverse weather adds to the cost of highway congestion, which now averages $78 billion a year in lost time and wasted fuel.
- Emergency response plans require real-time decisions about evacuations affecting thousands of households in a single incident.

To manage these and other risks to public safety, health, and property, urban leaders and managers need more accurate and specific weather information as input to their decision processes.

TENTATIVE AGENDA

as of **September 14, 2004**

Tuesday, September 21

7:30–8:30 a.m.	**Continental Breakfast**
8:30–8:45 a.m.	**Mr. Samuel P. Williamson**, Federal Coordinator for Meteorological Services and Supporting Research *Opening Remarks*
8:45–9:05 a.m.	**Dr. Kathie Olsen**, Associate Director for Science, Office of Science and Technology Policy *Policy, Science, and Partnership Issues for the Complex Urban Environment*
9:05–9:20 a.m.	**Ms. Nancy Suski**, Director, Emergency Preparedness and Response Portfolio, Science and Technology Directorate, U.S. Department of Homeland Security *Homeland Security Needs in Urban Meteorology*
9:20–9:35 a.m.	**Mr. Eric Webster**, Majority Staff Director, House Science Subcommittee on Environment, Technology and Standards *A Congressional Perspective on Urban Meteorology*
9:35–9:50 a.m.	**Dr. Ronald D. McPherson**, Executive Director, American Meteorological Society *Perspectives on Interdisciplinary Scope and Approaches to Urban Meteorology*

Tuesday, September 21—continued

9:50–10:05 a.m. **Dr. Gilbert Brunet,** A/Director, Meteorological Research, Meteorological Services of Canada
The Regional and Urban Numerical Weather Prediction and Operational Long Range Plan for the Meteorological Service of Canada

10:05–10:35 a.m. ***Break***

10:35 a.m.–12:05 p.m. **Panel 1:** Safety, Health, and Economic Impacts of Weather and Climate in the Urban Environment

Panelists

Dr. John A. Dutton, Professor Emeritus of Meteorology and Dean Emeritus College of Earth and Mineral Sciences, The Pennsylvania State University (*Co-moderator*)
Mr. Ray Ban, Executive Vice President of Meteorology Science and Strategy, The Weather Channel (*Co-moderator*)
Dr. John Hayes, NOAA/NWS
Dr. Josephine Malilay, CDC
Mr. Richard Carbone, NCAR
Dr. Sharon LeDuc, NOAA/NESDIS/NCDC

12:05–1:30 p.m. ***Lunch***

1:30–3:00 p.m. **Panel 2:** Regional Ecosystem Approaches to Urban Environmental Hazard Management

Panelists

Dr. Douglas DeMaster, NOAA/NMFS (*Co-moderator)*
Dr. Laurence S. Kalkstein, Senior Research Fellow, Center for Climatic Research, University of Delaware (*Co-moderator)*
Mr. Leroy Spayd, NOAA/NWS Meteorological Services Division
Dr. Lee Ann Thomas, Veterinary Services, USDA
Dr. Eugene Stakhiv, Institute for Water Resources, USACE
Dr. Sue Grimmond, International Association for Urban Climate

3:00–3:30 p.m. ***Break***

3:30–5:00 p.m. **Panel 3:** Adequacy of Urban Weather Observations

Panelists

Dr. Rayford P. Hosker, Jr., NOAA/OAR (*Co-moderator*)
Dr. Ken Crawford, Oklahoma State Climatologist (*Co-moderator*)
Dr. Walter Dabberdt, Vaisala
Mr. Richard Fry, DTRA
Dr. Jan Dutton, AWS Weather Bug
Dr. John McGinley, NOAA, Forecast Systems Laboratory

5:00–5:10 p.m. Administrative Remarks — Ms. Erin McNamara, OFCM Conference Coordinator for Logistics

5:10 p.m. ***Adjourn Day 1 session***
OFCM Staff Meeting

5:30 p.m. Icebreaker

Wednesday, September 22

7:00–8:00 a.m. **Continental Breakfast**

8:00–8:05 a.m. Administrative and Logistical Remarks — Ms. Erin McNamara, OFCM Conference Coordinator for Logistics

8:05–9:35 a.m. **Panel 4:** Research and Development for Urban Weather and Climate Applications

Panelists

Dr. Alexander MacDonald, Director, NOAA Forecast Systems Laboratory, (*Co-moderator*)
Dr. J. Marshall Shepherd, Research Meteorologist, Laboratory for Atmospheres, NASA-Goddard Space Flight Center (*Co-moderator)*
Dr. Robert Bornstein, San Jose State University
Dr. Lloyd A. Treinish, IBM Thomas J. Watson Research Center
Ms. Teresa Lustig, DHS, Science and Technology Directorate
Dr. David Williams, EPA, Office of Research and Development, Environmental Sciences Division

9:35–10:05 a.m. ***Break***

10:05–11:35 a.m. **Panel 5:** Managing Risk in the Urban Environment

Panelists

Mr. Harvey Ryland, President and CEO, Institute for Business and Home Safety (*Co-moderator)*
Ms. Margaret Davidson, Director, NOAA Coastal Services Center *(Co-moderator)*
Mr. Ranger Dorn, Battalion Chief, Ventura Co. Fire Department
Mr. John Gambel, DHS/FEMA
Dr. Janet Anderson, USDA Forest Service, Fire and Aviation Management
Mr. Jim Cook, Emergency Manager, Atlanta, Georgia

11:35 –11:55 a.m. **Dr. Walter D. Bach, Jr.**, Program Manager, Environmental Sciences Division, Engineering Sciences Directorate, U.S. Army Research Office
Summary of the Report, "Federal Research and Development Needs and Priorities for Atmospheric Transport and Diffusion Modeling"

11:55 a.m.–1:05 p.m. **Luncheon Session with Dr. James R. Mahoney**, Assistant Secretary of Commerce for Oceans and Atmosphere and NOAA Deputy Administrator
Delivering Improved Weather and Climate Services for the Urban Zone

1:05–1:30 p.m. ***Transition to Workshop Sessions***

1:30–3:00 p.m. Concurrent Workshop Sessions 1A and 1B

Workshop Session 1A
How to Improve the Content of Weather Observations
to Meet Modeling and Operational Needs for Urban Areas

Workshop co-chairs

Dr. Stephen Lord, NOAA/NCEP
Col. Mark Weadon, Air Force Weather Deputy for Federal Programs, NOAA

Wednesday, September 22—continued

Workshop Session 1B
Understanding the Needs of Urban Communities and Businesses

Workshop co-chairs
Dr. Betty Hearn Morrow, Consultant and Professor of Sociology, Emeritus, Florida International University
Dr. Walter Maestri, Jefferson Parish, Louisiana Emergency Management

3:00–3:30 p.m. ***Break***

3:30–5:00 p.m. Concurrent Workshop Sessions 2A and 2B

Workshop Session 2A
Measurement Strategies for the Urban Weather and Climate Domains (sensors, data collection, transmission, archiving, etc.)

Workshop co-chairs
Mr. Richard Fry, Defense Threat Reduction Agency
Dr. Sharon LeDuc, Deputy Director, NOAA/NESDIS/NCDC

Workshop Session 2B
R&D Needs for Ecosystem Approaches to Urban Health and Environmental Issues

Workshop co-chairs
Dr. Douglas DeMaster, NOAA/NMFS
Dr. John R. Scala, Millersville University

5:00–5:10 p.m. Administrative Information Provided to Workshops — Ms. Erin McNamara, OFCM Conference Coordinator for Logistics

5:10 p.m. ***Adjourn Day 2 session***
OFCM Staff Meeting

Thursday, September 23

7:00–8:00 a.m. **Continental Breakfast**

8:00–9:30 a.m. Concurrent Workshop Sessions 3A and 3B

Workshop Session 3A
Communicating Hazardous Weather Risks in the Urban Environment

Workshop co-chairs
Dr. David Krantz, Columbia University
Ms. Sandy Thomson, WANE-TV, Fort Wayne, IN

Workshop Session 3B
R&D Resources to Address Deficiencies in Modeling for Urban Weather, ATD, Space Weather, and Climate Applications

Workshop co-chairs
CDR Stephanie Hamilton, USN, DTRA
Dr. Steve Hanna, Harvard School of Public Health

9:30–10:00 a.m. ***Break***

Thursday, September 23—continued

10:00–10:15 a.m.	**Mr. Dave Jones**, Founder, President & CEO, StormCenter Communications, Inc., and President, Foundation for Earth Science *Increasing the Environmental I.Q. of America through innovative agency and media partnerships*	
10:15–10:30 a.m.	**Dr. Richard D. Rosen**, Assistant Administrator, Office of Oceanic and Atmospheric Research, NOAA *R&D to Meet Urban Weather and Climate Needs*	
10:30–10:45 a.m.	**Ms. Chris Elfring**, Director, Board on Atmospheric Sciences and Climate, National Academy of Sciences *Challenges in Making Weather and Climate Information Useful in Decision Making*	
10:45–11:00 a.m.	Summaries from Panel Moderators	Mr. Robert Dumont, OFCM
11:00–11:20 a.m.	Summaries from Workshop Co-Chairs	Lt. Col. Robert Rizza, OFCM
11:20 a.m.–12:00 p.m.	**Dr. Elbert W. (Joe) Friday**, WeatherNews Professor of Meteorology and Founding Director of the Sasaki Applied Meteorology Research Institute, University of Oklahoma **Dr. Paul D. Try,** Senior Vice President, Science and Technology Corporation *Forum Outcomes*	
12:00–12:10 p.m.	**Ms. Margaret McCalla**, Senior Staff Meteorologist, OFCM *Next Steps*	
12:10–12:25 p.m.	**Mr. Samuel P. Williamson**, Federal Coordinator for Meteorological Services and Supporting Research *Closing Comments and Forum Adjournment*	

Guiding Questions for Panelists and Workshops

In the following questions, "meteorological information" refers broadly to information about terrestrial weather, space weather, atmospheric conditions, and climate patterns. It includes observations (measurements of current conditions), predictions (forecasts), and the interpretation of both observations and predictions into consequences important to urban dwellers and urban managers. The Urban Meteorology Forum is focusing on five areas of meteorological information: severe weather, homeland security, air quality, water quality, and climate.

Important to all five focus areas are the ways that urban managers and decision makers (including the public and businesses) can use meteorological information and the ways to produce and communicate the information. The Forum panels and workshops will address the following crosscutting issues:

- Public health and safety, including immediate and longer term health effects
- Regional ecosystem planning and management (e.g., urban impacts of wildfires, waterway and coastal pollution impacts on aquatic/marine systems, regional air and water quality issues)
- Risk management and risk communication for time scales ranging from emergency preparedness (rapid response) and severe weather (intermediate time scales) to seasonal and generational climate fluctuations (long-term planning), with health, social, economic, and other risks and impacts considered
- Information dissemination and interpretation technologies, systems, and interfaces to move data efficiently from source to appropriate users, in formats useful to urban decision makers
- Research and technology tools, including models to predict meteorological conditions, ATD, and climate variations on local, regional, and global scales
- The integrated observation systems to support and validate these models, as well as to provide data on current conditions to users
- Education, outreach, and training for the entire range of current and potential users of urban environmental data
- Surface transportation, including street and roadway, rail, transit, marine transportation, airport ground operations, and pipelines
- Business continuity planning, including emergency services (health, public safety, security, crime deterrence), power and energy supplies, information system reliability and data integrity, customer access, and transportation and mobility.

The questions posed below for each panel and workshop are intended as guidance for the portions of the crosscutting issues to be emphasized by a particular panel or workshop.

Panel 1: Safety, Health, and Economic Impacts of Weather and Climate in the Urban Environment—What Can be Done? What Should be Done?

1. What meteorological information needed by urban decision makers is not yet available? Why is it not available? For example, are there problems in getting it soon enough, problems in interpreting it for the decisions to be made, or problems of having the right kind of meteorological information (observations and/or forecasts)?
2. How can we make better decisions about the value of having more or better meteorological information for managing the safety, health, and economic well-being of urban communities? What do we need to know to decide on the value of information? For example, do we need to do cost/benefit analyses before we decide what information is useful and how to provide it?
3. How can education, training, and outreach improve urban management and decision making with meteorological information? Can outreach to users aid in guiding R&D decisions and programs?
4. What actions can we take now to improve policies or systems for providing meteorological information important to the health, safety, and economic well-being of urban communities?

Panel 2: When Does Urban Management Require a Regional Ecosystem Approach?

1. What urban management problems need an ecosystem approach? What is different about an ecosystem approach to these problems, and why is it better? What part does meteorological information play in understanding the problems and enabling an ecosystem approach to solving them?
2. What are the limitations of currently available meteorological information for supporting ecosystem management approaches? What can be done to give the manager better information?
3. What education, training, and outreach activities could improve understanding of ecosystem management approaches and the role of meteorological and atmospheric conditions, and climate in ecosystem impacts?

Panel 3: Are Current Meteorological Observations Adequate for Urban Applications?

1. What are the requirements for timeliness, accuracy, and precision for urban applications of meteorological information (public health and safety; business and community planning and management; emergency planning, response, and recovery; transportation systems management; and power and communications vulnerability to solar eruptions)? Do current observing systems meet these requirements
2. Where current observing systems do not meet urban requirements; of these, which needs have the highest priority?
3. What are the major challenges in collecting, processing, assimilating and communicating urban weather observations to meet urban users' requirements?
4. Are the education, training and outreach challenges related to weather observations being addressed?

Panel 4: What R&D is Needed to Meet Urban Needs for Meteorological Information?

1. What meteorological information is needed by—but not yet available to—urban decision makers which cannot be provided without research and development (R&D)? What information needs could be better met through additional R&D? How long will it take to meet those needs?
2. What current R&D activities have the greatest potential to improve the meteorological information useful to urban decision makers? How long will it take to produce the improvements?
3. Based on the answers to questions 1 and 2, which R&D areas for meteorological information require more attention, higher priority, or more resources?
4. Are there R&D results/products that are ready for transfer into urban applications now? Which needs for urban meteorological information will emerging R&D results address?
5. How well are current R&D collaborations and partnerships working in meeting urban needs for meteorological information? Where are more collaboration and partnering needed or useful?
6. Are the current R&D transfer processes effective in supporting urban applications? How could they be improved? Are existing test beds and other testing facilities adequate for transferring technology to urban applications?

Panel 5: Using Meteorological Information to Manage Risk in the Urban Environment—How Well Are We Doing?

1. In each of the forum's five focus areas, what are the hazards to which meteorological information applies? What information is needed to manage the risks from those hazards? Is the information available?
2. What are the similarities and differences in information needed to manage risk by different categories of users, such as:
    (a) emergency response managers (including planners and responders)
    (b) business/enterprise managers
    (c) information media and other information providers
3. What education, training, and outreach activities should be part of risk communication and risk management in the five focus areas?
4. What planning techniques or risk management practices have proven to be most useful in responding to hazards in the five focus areas, such as urban weather disasters or air and water quality hazards? What improvements in meteorological information would support these practices?
5. Are we effectively transferring R&D results to applications to meet the needs of urban risk managers?

Workshop Session 1A: How to Improve the Content of Meteorological Observations to Meet Modeling and Operational Needs for Urban Areas

1. What are the primary deficiencies in the content of weather observations for urban areas in relation to modeling and operational needs?
2. What new sensors or other technologies are available or emerging that could improve the content of weather observations for urban areas?

3. What kind(s) of R&D should receive emphasis to meet unaddressed deficiencies in weather observations for urban areas?
4. Are new communication technologies sufficiently robust to accommodate current and future observation content, processing and dissemination for operational needs?

Workshop Session 1B: Understanding the Needs of Urban Communities and Businesses

1. What do forecasters need to know about today's urban communities?
2. How does the changing nature of urban communities affect their requirements for meteorological information?
3. What information will best help urban businesses prepare for and respond to hazards in the five focus areas?
4. What are the major deficiencies in meteorological information (including communication and interpretation of the information)? Which should receive priority in R&D or technology transfer?
5. Are additional education, training, and outreach activities needed?

Workshop Session 2A: Measurement Strategies for the Urban Weather and Climate Domains (sensors, data collection, transmission, archiving, etc.)

1. How should an observing network be designed to meet the requirements for meteorological and climate data in the urban environment? Which measurement tools, procedures, and processes are needed?
2. What current programs (e.g., observational testbeds, space-based systems) are addressing or planning to address observing network requirements?
3. Which measurement strategies will provide the most efficiencies and best cost/benefit returns for operational decision makers?
4. What needs are to be addressed across the spectrum of data gathering, collection, assimilation, archival, and dissemination processes?
5. Are different observing networks needed for weather and climate domains in the near, mid, and far terms?

Workshop Session 2B: R&D Needs for Ecosystem Approaches to Urban Health and Environmental Issues

1. What visualization techniques are available or emerging that would help convey air/water quality and health/environmental hazard information to a variety of users?
2. Are there research tools available to measure the socioeconomic impacts of meteorological information on urban communities?
3. What new modeling or forecast initiatives address air/water quality forecasts and their implications for health and the environment?
4. What observational databases are needed to improve air/water quality modeling?
5. What means are available to quantify and communicate air quality forecasts to decision makers?

6. What evaluation and verification metrics are available or should be developed for air/water quality forecasts?

Workshop Session 3A: Communicating Hazardous Weather Risks in the Urban Environment

1. What methods are needed to better communicate and disseminate meteorological information, particularly for impending hazards in the five focus areas?
2. Where should R&D be focused to further improve the communication of risks in the five focus areas?
3. What are examples of successful risk communication about hazards in the five focus areas that can be used as models? For example, can NOAA Weather Radio be expanded/modified to meet the needs of urban communities?
4. What new or emerging technologies will help communicate risks in the five focus areas more effectively to the urban community?
5. How can education, outreach, and training be more effective in eliciting rapid and appropriate public response to imminent hazards in the five focus areas?

Workshop Session 3B: R&D Resources to Address Deficiencies in Modeling for Urban Weather, ATD, Space Weather, and Climate Applications

1. What current or emerging science and technology resources are available to mitigate deficiencies in urban meteorological and climate modeling? Are the funding resources for these existing efforts adequate?
2. Are mechanisms available to transfer and apply emerging science and technology to address deficiencies in urban weather, ATD, space weather, and climate modeling? If mechanisms are available, are they funded adequately to meet user requirements for modeling products?
3. Are processes established to ensure the effective transfer of better modeling products to users' operations? What role should users play in the development and transfer process to ensure products are useful?
4. What type of basic or applied R&D is needed to meet deficiencies or future needs/challenges in urban weather, ATD, space weather, and climate modeling?
5. What criteria should be used to assign priorities for future R&D that addresses urban weather, ATD, space weather, and climate modeling?
6. How could collaborative R&D efforts be improved?